

Could Collaborative Research between Two Major Libraries Help Consolidate Digital Preservation and Break the “Project Cycle”?

Edith Halvarsson, Sarah Mason, Lee Pretlove, David Gerrard, Somaya Langlely, and James Mooney

The successful preservation of digital assets requires maintenance, continuity of service, and proactive stewardship.¹ An ongoing challenge for Bodleian Libraries (of Oxford University) and Cambridge University Library (CUL) has been taking outputs from time-bound digital preservation projects and turning them into ongoing uninterrupted services. This is not a challenge which is specific to Bodleian Libraries and CUL, but it has been recognized as a difficult transition for many organizations to make.²

The Digital Preservation at Oxford and Cambridge (DPOC) project (2016–2018) is a collaboration between Bodleian Libraries and CUL which is supported and funded by The Polonsky Foundation. Bodleian Libraries and CUL have historically strong ties, and have previously collaborated on digital preservation projects. Both organizations also have experience creating digital preservation resources, for which stewardship at the end of projects has been transferred over to staff within the libraries for maintenance. However, siloed preservation activities have so far not translated into institution-wide, ongoing programmatic digital preservation activities.

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Project-based work and alternative funding models will be a familiar scenario for many heritage institutions.³ According to the DPOC project's informal survey of peer heritage institutions, it is currently not the norm for digital preservation to feature as part of ongoing endowment funding in the United Kingdom. While heritage organizations may provide some informal support to preserve born digital assets and digitization outputs, commitment to the ongoing maintenance of these resources is often not explicitly spelled out or guaranteed, and alternative funding models are of continued importance.⁴ The authors argue that the lack of ongoing endowment and capital investment in digital preservation services reflects a tradition of digital heritage projects relying on commercial revenue models and project-based philanthropic funding.⁵ This funding tradition in conjunction with an advocacy gap, where the value of digital preservation as part of a heritage institution's core business functions has not yet been recognized,⁶ has resulted in a lack of ongoing endowment and capital investment. However, as illustrated by Bodleian Libraries and CUL, project-based approaches to digital preservation are inadequate. Staff change-over during project funding breaks, the inability to make long-term strategic plans, a lack of steering due to project boards dissolving, and the need to come up with innovative research in order to secure new funding can all negatively impact an organization's ability to provide a consistent and uninterrupted digital preservation service.⁷ For these reasons, project-based approaches do not align well with the vision of digital preservation as a service that underpins core business functions.

The DPOC project was created with these lessons in mind. The Polonsky Foundation is funding the Bodleian Libraries and CUL to research current digital preservation capabilities at both institutions with the aim of creating business cases for ongoing and sustainable digital preservation programs. In recognition of the difficulty of moving from project activity to ongoing programmatic activity, the DPOC project was designed around two models developed by McGovern and Kenney. The first model is the "Three-Legged Stool" model, which looks at the organizational resources required for a successful digital preservation program. The second model is the "Five Organizational Stages of Digital Preservation," which examines the typical steps an organization will take when moving from project to programmatic activity and to external collaboration.

This chapter examines how the DPOC project has attempted to address digital preservation continuity issues at both organizations by framing the work completed during the project around the Five Organizational Stages model. Learning from past lessons, the project has lobbied for embedding digital

preservation responsibility across both organizations. However, this chapter will argue that this solution is not enough, and that without ongoing dedicated digital preservation staff, these solutions are ultimately fragile.

This chapter will also outline and make use of the Five Organizational Stages maturity model to discuss how collaboration has worked across the two institutions. McGovern and Kenney argue that external collaboration is hard while an organization is in a project phase because its attention is, by necessity, internally focused.⁸ This chapter will describe how the DPOC project found this observation to be true, and how considerable effort was required to balance the collaborative nature of the project with competing local internal concerns. This chapter argues that despite the challenges of collaboration, this mode of working has produced better work as well as increasing management's confidence in shared decisions and recommendations. It will finally argue that one of the most rewarding aspects of collaboration is its potential to inform initial planning for the longer term—an aspect which is challenging for organizations that are still in a digital preservation project phase.

Project Background

The DPOC project was funded for a two-year period by The Polonsky Foundation. It officially began in August 2016 and is scheduled to end in December 2018, following a project extension. The Polonsky Foundation had previously funded substantial digitization projects at Bodleian Libraries and CUL, such as Bodleian Libraries' Polonsky Digitization Project⁹ and the initiation of Cambridge Digital Library.¹⁰ For this reason, the focus of the DPOC project was on digitized assets and digitization workflows. However, in order to streamline preservation practices, lessons from the DPOC project have also informed recommendations for collection content which is, or will be, managed on the same technologies as image content. In order to make these recommendations sustainable, the project aim was to either create (Cambridge) or re-establish (Oxford) digital preservation programs in both institutions by building upon existing expertise and research in the field of digital preservation and curation.¹¹

Figure 14.1 shows the overall structure of the project. There were a total of six digital preservation specialists (referred to as Polonsky Fellows), with three based in each institution. They were: two Policy and Planning Fellows, two Outreach and Training Fellows, and two Technical Fellows. The roles were mirrored at each institution in order to promote collaboration, knowledge exchange, and peer support. The roles were modeled around the "Three-Legged

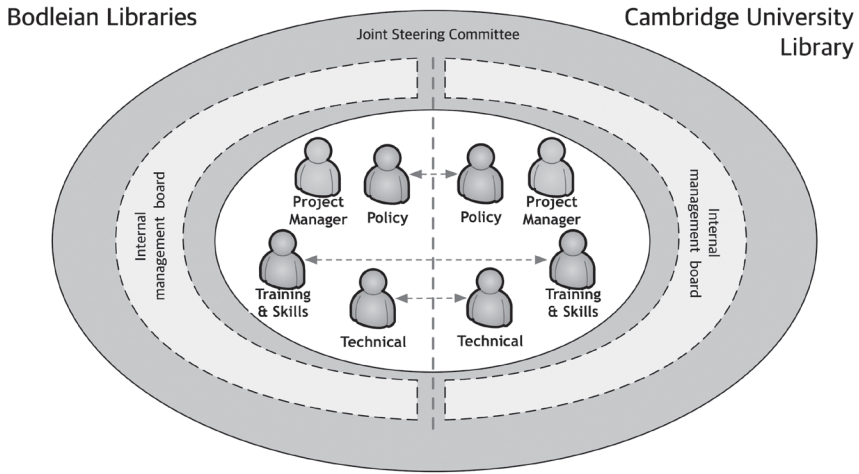


Figure 14.1 • Collaborative project structure

Stool” of digital preservation. The Three-Legged Stool model was developed for the Digital Preservation Management workshop series; it is intended to show that a sustainable digital preservation program addresses not only technological concerns, but also financial and organizational issues.¹² The three legs of the model are organizational infrastructure, technological infrastructure, and resources framework.¹³ The organizational leg focuses on the policies, staffing, and procedures that are needed for digital preservation activities.¹⁴ The technological leg focuses on hardware, software, and other tools, while the resources leg focuses on funding, support, and the time required for running a digital preservation program.¹⁵ A clear commitment is required for each of the legs in order for a digital preservation program to be successful.

The local teams, led by a project manager, worked on their local digital preservation requirements, although both teams were broadly aligned in carrying out the aims of “auditing current provision, reviewing current good practice, and recommending enhancements that might be made to improve the local digital preservation infrastructure (including policy framework, provision of people, skills, and technical infrastructure).”¹⁶ As well as working together in their respective local teams, each Fellow worked with their mirrored partner on joint initiatives and “shared solutions” where appropriate.

The Five Organizational Stages

The work of Kenney and McGovern informed much of the DPOC project's design. In addition to the Three-Legged Stool model on which the Fellowship roles were modeled, the project initiation document was informed by Kenney and McGovern's paper on the Five Organizational Stages maturity model.

That paper was published fifteen years ago in 2003, but it still has enduring relevance and uptake in the digital preservation community. The authors are aware that other maturity models do exist,¹⁷ but there is a tendency in the digital preservation community to select models that are light weight and technology focused. The "Three-legged Stool" model was chosen because of its holistic approach to digital preservation, focusing not only on technology, but also on the organizational policies and resources that necessarily contribute to preserving an organization's digital assets.

Kenney and McGovern's paper proposes five stages of organizational digital preservation maturity based on their own experiences of setting up a digital preservation program at the Cornell University Library. Each stage is accompanied by a list of key indicators to aid an organization in assessing its current level of maturity. In order to track the DPOC project's experience of progressing through stages two, three, and five of Kenney and McGovern's maturity model, the stages are briefly summarized below (see table 14.1). In addition, Kenney and McGovern mention three resources to assess progression through the stages; these are workforce, technology, and funding.

Kenney and McGovern assert that upon assessing an organization against these stages, one can predict some of the likely responses from an organization, as well as the challenges ahead for moving to a higher level of maturity. The stages are a helpful guide, and act as a starting point which enables organizations to concentrate their efforts in reaching levels of maturity that are suitable for them.

The authors argue that what is lacking in the Five Organizational Stages model is an organization's workforce and funding as key indicators for tracking progression through the five stages. Although workforce and funding are two of the three resources that organizations can assess while tracking their progression, only technology is translated into a key indicator.¹⁸ Without the other two resources as key indicators, determining the organizational stage based solely on the technology is more subjective. The authors recommend that workforce and funding be included in the list of key indicators in order to improve organizational benchmarking.

Table 14.1 • A summary and adaptation of Kenney and McGovern's "Five Stages of Organizational Digital Preservation Maturity" (2003)

STAGES	
STAGE 1 <i>Acknowledge</i>	Description: Stage one is when an institution engages with digital content and realizes that it needs to act to preserve digital content, since it has very little policy, infrastructure, and resources.
STAGE 2 <i>Act</i>	Description: The second stage is the reaction to the acknowledgment that something must be done, so a project is launched. These are often "one-time" fixes that are exploratory and finite. Key indicators <ul style="list-style-type: none"> • Policies tend to remain high-level. • Technical requirements may be produced, but they are often specific to certain projects and not organization-wide. • The preservation requirements for a larger set of collections are addressed (at least in some basic way).
STAGE 3 <i>Consolidate</i>	Description: The organization looks to move into practical solutions even though it may not have a fully funded program, and the practical response begins the process towards making digital preservation an ongoing commitment so that it is awarded ongoing funding. Key indicators <ul style="list-style-type: none"> • The organization understands the value of policy driving digital preservation, and develops some basic essential policies. • The assessment of current technological investment becomes more systematic. • The requirements for building and maintaining collections are further developed, and importantly, redundancies and efficiencies in current practices are identified.
STAGE 4 <i>Institutionalize</i>	It is at this point that digital preservation becomes an institutional (or organizational) concern where all the resources, infrastructure, and policies and procedures are embedded across the board, so that digital preservation becomes a part of the fabric of the organization.
STAGE 5 <i>Externalize</i>	Once the organization has consolidated its digital preservation provision, it can then look to stage five, which Kenney and McGovern envision as a technical consortium model. Key indicators <ul style="list-style-type: none"> • The organization takes part in collaborative work. • Technological solutions are spread across external institutions. • Collections are developed in a shared environment.

It is important to note that Kenney and McGovern do not argue that these stages always happen in a linear way, or that the cutoff point between different stages is clear.¹⁹ An organization may, for example, move backwards on the maturity scale or display features of a stage that is much further ahead of its current maturity level. Instead, the Five Organizational Stages model shows a common and simplified progression model. As such, the DPOC project stands out against the common progression model of many organizations because it is attempting to externalize (stage five) while simultaneously looking inwards and consolidating (stage three). Since both organizations have had a cyclic period over the past twenty years of moving between stages one to three, it is also clear that the highest level of maturity is never the final finish line. Without ongoing advocacy which ensures that digital preservation remains a wider institutional concern, hard-earned gains can easily be lost.

STAGE TWO

Acting to Gather Requirements

Realizing that there is “no single best way” to “do” digital preservation, Kenney and McGovern suggest that organizations must first understand their own local requirements in order to “identify which combination of policies, strategies and tactics are likely to be most effective in meeting their needs.”²⁰ It was to this end that the DPOC project was broadly planned over two years. The first year was planned around assessing and auditing the respective institutions. The second year was planned around piloting recommendations with the goal of making digital preservation a “business as usual” activity. The year two deliverables, which were informed by the year one audits, closely aligned with key indicators identified in the maturity model which may move an organization from stage two (act) to stage three (consolidate) in the maturity model.

The key deliverables for each pair of Fellows are summarized in table 14.2.

Each pair of Fellows either worked collaboratively or provided feedback on each other’s work. Naturally, each organization had different requirements that emerged from the audits, but by testing similar methodologies and approaches at both institutions, the DPOC project was able to produce joint guidelines and tools for the digital preservation community—such as a skills audit toolkit and an analysis tool for identifying local training needs.

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Table 14.2 • Key deliverables for each pair of Fellows

	YEAR 1 (ACT: STAGE TWO)	YEAR 2 (CONSOLIDATE: STAGE THREE)
<i>Policy and Planning Fellows</i>	Produce a collection survey of legacy content, and recommendation around current workflows	Produce a digital preservation policy, and an institutional strategy/road map
<i>Technical Fellows</i>	Produce an audit of current technology used by the organizations, and recommendations for improving current infrastructure and tool support	Create and begin implementing plans for future infrastructure
<i>Outreach and Training Fellows</i>	Undertake a training needs audit of staff, including initial recommendations	Begin delivering target training

Moving from Stage Two to Stage Three: Beginning to Consolidate

After auditing and surveying, the work and recommendations for improvements and enhancements were devised with the intention that they would be sustained beyond the life of the project, so that both organizations would have digital preservation activity and knowledge embedded in the organization. Within the context of organizational stages, the project moved quickly from acknowledging into consolidation through the piloting of such recommendations.

What follows is a description of the work that was devised with sustainability in mind so that the respective institutions could move beyond the consolidation stage and would not regress back to the project stage; this is a potential scenario identified in the Five Organizational Stages model. Of course, due to different organizational contexts, the details of the work did vary, and these similarities and differences are reflected upon here. What is interesting from the analysis of Bodleian Libraries and CUL is that the same organization exhibited key indicators from different levels of the maturity model. For example, at Bodleian Libraries, technology is more mature (stage three) than workforce skills (stage two).

Developing Policy and Strategy

In the first year, a digital preservation policy outline and policy template was created jointly by the Policy and Planning Fellows. It broadly aligns the two organizations around common themes, but it is being adapted locally with

input from a wide range of stakeholders. The key for both organizations has been to ensure that the digital preservation policy covers a wider range of digital collection material, since the focus has so far been on a limited subset of records at Bodleian Libraries, while CUL did not have any policies whatsoever regarding its digital collections. This aligns with the key indicators in Kenney and McGovern's model which suggest that only a limited set of collections are considered for preservation before reaching stage three.

The DPOC project's approach to policy and strategy writing was to consider it holistically within the wider university environment. A gap analysis was completed of the wider policy and strategy landscape at both institutions, before writing new policies. This was important, since the authors found that digital preservation policy was viewed in isolation from other policies. The review found that a cultural shift is required in both institutions in order to make policy and strategy efficient. This echoes Kenney and McGovern's observation that the importance of policy as a driving force for digital preservation tends to first be recognized in stage three (consolidation).²¹ At both institutions, policy is viewed as an end-goal in itself and it tends to become static, outdated, and not adequately communicated to staff. Rather, the staff often regard policy as inefficient, since they do not appreciate that policy requires a framework and institutional buy-in to become a working document.

The authors argue that policy is much more than a *static* document; policies are *active* documents that require frameworks and well-accepted ownership across all levels of the organization. The importance of communicating the significance of policy governance was not initially considered in the project initiation plan. It subsequently became evident that policy communication plans and creating governance groups within the libraries are larger pieces of work than policy-writing itself. This is an important area of work in order to move the organizations to stage three (consolidation).

Developing Realistic, Sustainable Infrastructure

Bodleian Libraries were in a good position at the start of the DPOC project, having recently invested in their own world-class virtual and physical infrastructure; this allowed for the migration of existing systems and services, with sufficient capacity for future growth. However, it was clear that many potential collaboration opportunities existed between Bodleian Libraries and other GLAM institutions based within Oxford University. Geographically distributed storage was a key area that all parties would benefit from, and this requirement served as an excellent starting point to begin discussions to coordinate wider

infrastructure and digital preservation requirements, highlighting where efficiencies and redundancies could exist.

Bodleian Libraries are now beginning to move toward institutionalization (stage four) based on the Kenney and McGovern model, with joined-up thinking on how the libraries carry out digital preservation across Oxford University affiliated GLAM institutions, rather than specific areas within the libraries focusing solely on their own needs. With the introduction of shared services, there is hope that these systems become integral to the wider university and thus continue to be funded centrally, allowing Bodleian Libraries to break out of the project cycle funding model. The DPOC project has provided much-needed digital preservation knowledge and expertise to the institution, the team has been a bridge to begin wider discussions, and without the project as a catalyst, progress on building a sustainable infrastructure for Oxford University GLAM institutions might have faltered.

Developing a Sustainable Workforce

In order to assess workforce maturity at Bodleian Libraries and CUL, a skills audit toolkit was designed and implemented in year one. The toolkit contains interview questions and an online survey template, based on the DigCurV Curriculum Framework. The framework lists over 100 digital preservation skills for executives, managers, and practitioners.²² The audits identified gaps in general digital preservation awareness. There were further gaps around familiarity with digital preservation terminology and digital skills. Because the Five Organizational Stages model does not address workforce development, the review of the two organizations' current maturity was subjective. It is the view of the authors that in terms of skills, Bodleian Libraries and CUL are at stage two (act) of maturity, since their current capacity cannot support the development of staff to acquire basic digital preservation skills or awareness.

Addressing identified gaps through training and workforce development would ensure that Bodleian Libraries and CUL maintain stage two (act), but it will be insufficient alone to reach stage three (consolidation). Moving to stage three requires the commitment of financial and staff resources, which must extend beyond project funding and temporary workforces such as the DPOC Fellows.²³ Based on current workforce skills and experience, responsibilities must be aligned with current digital preservation activities without pushing staff beyond their reasonable capacity. It is the view of the authors that in order to achieve a higher level of maturity, rewriting job descriptions and finding

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additional resources to support new roles will be required. Although the organizations' technical infrastructure is at a higher level of maturity, technology will not be sustainable without developing the workforce in tandem in order to critically assess and ensure that technical solutions are not neglected.

Moving from Stage Three back to Stage Two

Kenney and McGovern's description of stage three resonates with the authors' experience on the DPOC project. At the end of the project's first year, both teams neared the stage of embedding the recommendations at their organizations. However, sustainability remains a challenge.

DPOC is not the only digital preservation project which has been run at Bodleian Libraries and CUL. Both organizations have participated in a number of discrete projects focused on digital preservation and curation. The projects' outputs have had varying longevity beyond the end of the projects, and a large sustainability factor has been staff retention and knowledge exchange. Selected projects are explored below to give context to the challenges involved in creating sustainable programs from projects.

CURL Exemplars for Digital ARchiveS (CEDARS)

CURL Exemplars for Digital ARchiveS was a five-year project running from April 1998 to March 2002.²⁴ As a collaboration between the members of the Consortium of University Research Libraries (CURL)—now Research Libraries UK (RLUK)—with lead sites at Cambridge,²⁵ Oxford, and Leeds universities, the project resulted in a number of reports about the challenges of digital preservation. One of the project deliverables was to promote awareness of the importance of digital preservation. Since the project's completion sixteen years ago, awareness in both organizations has slid back because this activity has not been maintained and staff have moved on.

CUL DSpace Project

Cambridge University was one of the earliest adopters of the open-source DSpace repository system; its experience with DSpace provides a useful example of how the responsibilities for systems intended for the longer-term management of digital assets can shift over their lifetimes. Over the years, CUL has

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implemented several DSpace instances for different purposes, with some of these languishing over time. The establishment, implementation, and embedding of the primary DSpace repository took place over the span of several projects including the Cambridge University Preservation Development programme (CUPID) (2009–2010), Evaluating Plato in Cambridge (EPIC) (2011), and Preservation: Promoting Awareness to Researchers (PrePARE) (2011–2012). The responsibility for this repository has sat with the Office of Scholarly Communications (formerly the DSpace@Cambridge team).

While it cannot be classed as a preservation system, DSpace has regularly served the function of being a place where completed project outputs were stored at Cambridge,²⁶ and as such it has often been considered as the “permanent” repository by some staff. When first set up at Cambridge in 2003,²⁷ DSpace was administered by the central IT function (University Information Systems), though CUL staff were the primary users. In 2010, full responsibility for the maintenance of Cambridge’s DSpace system was transferred to CUL, including an actual physical transfer of the hardware upon which it was hosted at the time. Responsibility for managing the system then changed hands within the library. Staff with the skills required to maintain the system came and went, until it was given a new lease of life by Cambridge’s Office of Scholarly Communications in 2012. The DSpace system now forms the core of Cambridge’s Apollo open access repository and was tested beyond its limits when Professor Stephen Hawking’s PhD thesis was made available via the system during Open Access Week in 2017.²⁸

Bodleian Electronic Archives and Manuscripts

The PARADIGM project (2005–2007)²⁹ and then the futureArch project (2008–2012)³⁰ were previous projects at Bodleian Libraries to look at the preservation of digital content, which led to the creation of the Bodleian Electronic Archives and Manuscripts (BEAM) service in 2012—this moved the institution from stage two to stage three. BEAM established a mixed sustainability approach that is based on both endowment and ongoing external funding sources. This service has endured thanks to the dedication of current members of the staff, but it relies heavily on project-based funding in order to survive and develop. The DPOC project worked with BEAM to review the latter’s current systems and workflows. The Fellows advised BEAM on how to refresh its underlying initial project-funded infrastructure with the goal of

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utilizing the existing wider institutional infrastructure. This would allow BEAM to be more sustainable and supportable in the future, pushing it further into stage three rather than letting it slip back to stage two.

Since these digital preservation attempts have been short-term projects, each involving a somewhat different arrangement of staffing, continuity regarding digital preservation has been an issue. The impetus to continue supporting outputs from digital preservation projects is more likely to be sustained if responsibility is taken on by permanent members of the staff. This momentum is likely to eventually run out, however, as key members of staff move on to new roles and knowledge about assets is lost. Without dedicated staff to question assumptions about services and keep technologies fresh, services are likely to deteriorate. Without the continuous monitoring of systems, “myth building” about what services are actually doing begins to permeate the organization.

Anticipating and Working around the Project-Program Cycle

In the case of the DPOC project, the first part of establishing a digital preservation program was to start it as a project with finite funding for two years. The authors argue that establishing a program in this way had an impact on the focus of the project. In addition to completing project deliverables, there has also been a need to seek further funding to continue the work and avoid a repetitive cycle of project-based approaches to digital preservation.

One challenge for sustaining project funding for digital preservation is that digital preservation at its core focuses upon the maintenance of digital assets. There is a mismatch between this objective and the remit of many funding bodies. Funding bodies instead tend to value innovative initiatives, and they “have little interest in helping pay the monthly rent.”³¹ This creates a difficult pattern where funding bodies do not generally fund core library services and “business as usual” activities, while on the other hand libraries do not prioritize digital preservation as a necessary service that requires ongoing funding. Tools such as the Curation Exchange Tool,³² the 4C Cost Model for Digital Preservation,³³ and the Cost of Inaction Calculator³⁴ have attempted to quantify the value of preserving digital assets in order to underpin advocacy work, but despite these initiatives, the case for digital preservation has arguably not been fully successful.

An inability to account for the value that preserved assets provide is another challenge. The DPOC project’s review of existing preservation repository systems indicates that these systems have been developed with “the value of the asset” being assumed as a given before they are ingested. Functions such as

accurate reporting upon the use of assets preserved by the system are not much in evidence, a factor that may be related to the separation of concerns between “preservation systems” and “delivery systems” implied by the Open Archival Information System Reference Model.³⁵ As CUL’s experience with DSpace shows, this is not sustainable given that the value of preserved resources *must* be restated constantly. The responsibility for maintaining the system must be clearly assigned if the overall preservation system itself is to be maintained adequately.

The DPOC project does not yet know what combination of funding approaches it will pursue at the end of the project, but at some point it is clear that without at least part of the funding coming from the two universities’ endowment and/or capital funds, both organizations are likely to move backwards in terms of maturity. Alternative revenue models for digital preservation or data management services have been attempted, such as creating additional value-adding services or innovative research which can supplement everyday maintenance activities.³⁶ However, the authors of this chapter have not so far come across a model that fully supports a digital preservation program without some ongoing endowment and/or capital funding support. Without ongoing funds, both organizations are also going to struggle with the siloing of staff and services and will not be able to achieve economies of scale.

STAGE FIVE

Externalize, the DPOC Project, and Collaboration

The final stage of Kenney and McGovern’s model (stage five) is at the end of the linear progression and involves embracing collaboration and organizational interdependency; the potential for shared services and responsibilities is realized at this stage.³⁷ As two of the six United Kingdom and Ireland’s Legal Deposit Libraries, Bodleian Libraries and CUL’s collaborative efforts with the British Library on a shared e-legal deposit infrastructure is an example of stage five work. Collaboration provides a number of benefits, including:

- The sharing of development costs
- Shared learning and training opportunities
- Access to diverse expertise
- Shared research and influence on the development of practices
- Opportunities to develop shared services³⁸

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Despite both Bodleian Libraries and CUL not yet having attained stage five maturity, one strength of collaborating at an earlier stage of maturity has been the ability to make long-term plans for potential business cases and shared services. The authors believe that their chances of embedding digital preservation at an institutional level (stage four) will be more attainable through earlier collaboration.

Although stage five focuses mainly on collaboration to reach digital preservation goals, collaborative efforts are also possible at other stages. The DPOC project utilized collaboration to produce better work through peer review and to increase accountability to meet deadlines, and both organizations used each other for increased influence. For example, if CUL makes a decision related to digital preservation, it could provide influence for a similar decision at Bodleian Libraries and vice versa.

While collaboration was beneficial for the DPOC project, the authors found that collaboration was sometimes difficult during stage two (act) and stage three (consolidate). When working on a collaborative project, the organizations involved do not need to align perfectly since they may not have the same priorities; therefore, the organizational needs and tasks will not always align. It was clear after completing the audits that Bodleian Libraries and CUL required different strategies to address areas where the libraries were at different stages of digital preservation maturity. The internal requirements meant that extra effort had to be invested in ensuring that the collaboration was successful and that communication continued throughout busy periods.

For effective collaboration, communication and sharing are key.³⁹ Due to the different geographic locations of both institutions, the DPOC Fellows collaborated through online communication and task management tools. These are outlined in table 14.3.

While online tools can increase productivity and collaboration, they can also stymie it.⁴⁰ Geographically disparate collaboration requires the use of virtual tools for instant communications, but this does not mean that team members will communicate regularly; in fact, the likelihood of miscommunication and failures increases when tools are ignored or misused.⁴¹ The DPOC project could have made more effective use of online tools had the project's online communication needs been clearly defined prior to selecting its collaboration technologies. A plan for how the online tools should be used would have increased their efficacy and outlined project members' responsibilities. Technology does not guarantee effective communications, but having an agreed-upon plan will outline the requirements and responsibilities for it.⁴² This is especially

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Table 14.3 • DPOC virtual project communication and management tools

TOOL	PURPOSE
<i>Slack</i>	Real-time informal communication and sharing - not intended to be a formal, enduring record of decisions
<i>Asana (used with Instagantt)</i>	Task management and project management, resource tracking
<i>SharePoint</i>	Shared project document space
<i>Google Drive</i>	Document collaboration (later move versions to SharePoint)
<i>E-mail (calendar)</i>	Formal communications and formal meeting invites
<i>Skype</i>	Virtual meetings - project and one-on-one basis
<i>WordPress</i>	Project website and blog

important when attempting to collaborate during earlier maturity stages, when attention is focused on internal organizational needs.

Discussion and Conclusion

This chapter has mapped the activities undertaken by the DPOC project over its first fourteen months against Kenney and McGovern's Five Organizational Stages model. The DPOC project was in some ways a departure from a linear progression of the maturity model, since it incorporated institutional collaboration (stage five) into maturity stages two (initiating digital preservation projects) and three (seguing from projects to programs). While bringing together two institutions that are at different stages of digital preservation maturity may seem fraught with difficulty, the collaborative nature of the project helped to advance and consolidate both organizations. By using similar methodologies at both institutions, the DPOC project was also able to produce tools and guidelines which are not specific to their own organizations and can be adapted by organizations wishing to undertake similar activities. It is the hope of the authors that the departure from the linear progression of the model and the descriptions of the collaborative nature of the DPOC will be helpful for organizations that are thinking of how to establish local digital preservation projects and eventual programs.

However, mapping against the model also exposed the fact that while the DPOC project helped move CUL and Bodleian Libraries from stage two to stage three of maturity, the organizations have historically struggled with retaining momentum to sustain ongoing organization-wide digital preservation programs. Both organizations have previous experiences of creating digital

preservation assets in a project capacity, for which stewardship at the end of projects has been transferred to staff within the libraries. However, these projects have still not translated into organization-wide, ongoing, programmatic digital preservation activities, and the energy to keep project outputs or services going can easily dwindle.

The authors have argued that the successful preservation of digital assets requires maintenance, continuity of service, and proactive stewardship—and these are all things which are incongruous with completely project-based funding. Because both organizations have had a cyclic period over the past twenty years of moving between stages one to three, it is also clear that even the highest level of maturity is never the final finish line. Without ongoing advocacy to ensure that digital preservation remains a wider institutional concern, hard-earned gains can easily be lost. The key finding here is that these things take time and that digital preservation programs require at least part of their funding to come from central sources should organizations wish to move beyond stage three. If this does not happen, organizations will continue to work in a perpetual cycle of stage two and stage three, whereby they launch digital preservation projects, get close to transitioning to business as usual, and when there's a funding gap, find themselves slipping back to stage two.

Breaking the project-program cycle is not only about embedding digital preservation activities across staff and departments, but ensuring that there are ongoing centralized roles that are responsible for internal advocacy and the monitoring of services. Without staff who are responsible for monitoring systems and technologies, these can easily become neglected and gradually deteriorate. Having both ongoing dedicated digital preservation roles and distributed responsibilities is more likely to occur when a wide section of an organization is invested and sees the benefits of digital preservation. For example, at Bodleian Libraries, like Cornell University Library, the move to involve a wider range of stakeholders in digital preservation has been primarily sparked by discussions to begin consolidating different repository services around shared technologies. This has included looking at establishing a joint infrastructure across the other GLAM institutions based at Oxford University. Similarly at CUL, the planned consolidation of technical infrastructure and delivery platforms has been born out of the work of the DPOC project in raising awareness of the importance of digital preservation and the need to embed digital preservation policy and knowledge within the organization.

Whether the DPOC project has broken the project cycle will only become apparent within the next three to five years. The authors believe that the efforts of the DPOC project have given the two institutions a strong basis not to

regress. While the Bodleian Libraries and CUL are at different stages of organizational maturity, they have both made significant advances. Using the Three-Legged Stool and Five Organizational Stages models for developing the DPOC project has been a sound method to initiate a digital preservation project and influence sustainable solutions. In addition, collaboration has enabled the organizations to plan with the long term in mind and advocate for the preservation of digital assets.

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NOTES

1. Langley and Halvarsson 2017.
2. Kenney and McGovern 2003.
3. See commercial partnerships such as ProQuest, Artstor, and Ancestry.com, crowd-funding initiatives like the Heritage Lottery Matchfund, and experimentation with freemium models (such as the Stanford Encyclopedia of Philosophy).
4. Maron and Ithaka S+R 2014, 48.
5. Maron and Ithaka S+R 2014.
6. Fay 2014.
7. Langley and Halvarsson 2017.
8. Kenney and McGovern 2003.
9. Bodleian Libraries 2013.
10. Cambridge University Library 2015.
11. Digital Preservation at Oxford and Cambridge 2017.
12. Cornell University Library and MIT Libraries 2007.
13. Ibid.
14. Monson 2017, 157.
15. Ibid., 157.
16. Digital Preservation at Oxford and Cambridge 2017.
17. Including the NDSA Levels of Maturity, the CLOCKSS Threats and Mitigations model, and the Digital Preservation Capability Maturity Model.
18. Kenney and McGovern 2003.

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19. Ibid.
20. Ibid.
21. Ibid.
22. DigCurV 2013.
23. Kenney and McGovern 2003.
24. Consortium of University Research Libraries n.d.
25. CUL has been involved in several other digital preservation-related projects, including the JISC Research Data Shared Service (RDSS) (2016 - 2019), The Dynamic Digital Library Scoping Project (2015 - 2017), Preservation: Promoting Awareness to Researchers (PrePARE) (2011 - 2012), Evaluating Plato in Cambridge (EPIC) (2011), Incremental (2010 - 2011), DataTrain (2011) and Cambridge University Preservation Development programme (CUPID) (2009 - 2010).
26. For example, the record at <https://www.repository.cam.ac.uk/handle/1810/195838> is the archived copy of the website at <http://linux02.lib.cam.ac.uk/earlscolne/>.
27. P. Morgan 2004.
28. BBC News 2017.
29. Bodleian Libraries 2008.
30. Ibid.
31. Maron and Ithaka S+R 2014, 6.
32. 4C Project n.d.
33. Ibid.
34. "Cost of Inaction Calculator," AVPreserve, <https://coi.avpreserve.com/>.
35. Consultative Committee for Space Data Systems Secretariat 2012.
36. The University of London Computer Centre's model is one example of a consulting model which has used internal expertise on digital preservation to supplement its revenue through teaching and advocacy work.
37. Kenney and McGovern 2003.
38. Kwon, Pardo, and Burke 2009.
39. Ross 2011; Kliem 2008.
40. J. Morgan 2013.
41. Kliem 2008, 73.
42. Ibid., 74.

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